Amana®
Heating ▪ Air Conditioning
A higher standard of comfort

PGA**C, PGB**C and PGD**C Single Package Gas-Electric Heating and Cooling Unit

Installation Instructions

Affix this manual, Specification Sheet and User Information manual adjacent to the unit.

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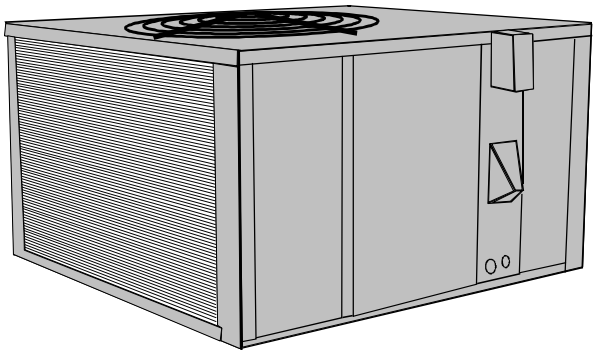


Amana Forced Air Central Units Design Complies With Requirements Embodied in The American National Standard / National Standard of Canada Shown Below.

ANSI Z21.47•CAN/CGA-2.3 Central Furnaces

⚠ RECOGNIZE THIS SYMBOL AS A SAFETY PRECAUTION

ATTENTION INSTALLING PERSONNEL

As a professional installer you have an obligation to know the product better than the customer. This includes all safety precautions and related items.

Prior to actual installation, thoroughly familiarize yourself with this Instruction Manual. Pay special attention to all safety warnings. Often during installation or repair it is possible to place yourself in a position which is more hazardous than when the unit is in operation.

Remember, it is your responsibility to install the product safely and to know it well enough to be able to instruct a customer in its safe use.

Safety is a matter of common sense...a matter of thinking before acting. Most dealers have a list of specific good safety practices...follow them.

The precautions listed in this Installation Manual should not supersede existing practices but should be considered as supplemental information.

January1998(1)

Amana
Fayetteville, TN 37334

10692406

I. Safety Information

IMPORTANT

TO THE INSTALLER

Before installing this unit please read this manual and the Specification Sheet to familiarize yourself on the specific items which must be adhered to such as maximum external static pressure to unit, air temperature rise, minimum or maximum CFM and motor speed connections.

TO THE OWNER

It is important to complete the owner registration card and mail it immediately. This will assist Amana in contacting you if any service or warranty information should change in the future. When completing the registration card, be sure to include the Model, Manufacturing and Serial Numbers, plus the installation date.

The warranty certificate is also supplied with the unit. Read the warranty carefully and note what is covered. Keep the warranty certificate in a safe place so you can find it if necessary.

If additional operating instructions are required, call the dealer where the purchase was made. Keep this literature in a safe place for future reference.

WARNING

To prevent death, personal injury or property damage due to fire or explosion, installation procedures in this manual must be followed exactly.

WARNING

Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the unit before shutting off the electrical supply.

WARNING

To prevent death, personal injury or property damage, do not use this unit if any part of the unit has been under water. Immediately call a qualified service technician to inspect the unit and to replace any part of the control system and any gas control which has been under water.

If you smell gas:

- **Do not try to light appliance.**
- **Do not touch any electrical switch: do not use any phone in building.**
- **Immediately call gas supplier from a neighbor's phone. Follow gas supplier's instructions.**
- **If gas supplier cannot be reached, call fire department.**

WARNING

To prevent death, personal injury, or property damage due to improper installation, adjustments, alterations, service or maintenance, when servicing or performing maintenance to this unit consult this manual, service manual, qualified installer, service agency or gas supplier.

WARNING

This product contains or produces a chemical(s) which may cause death or serious illness and which are known by the State of California to cause cancer, birth defects or other reproductive harm.

IMPORTANT NOTE: This unit must not be used as a "construction heater" during the finishing phases of construction on a new structure. This type of use may result in premature failure of the unit due to extremely low return air temperatures and exposure to very dirty atmospheres.

LOCATING THE UNIT

WARNING

To prevent death, personal injury, property damage or equipment damage, the following points must be observed when installing the unit.

ALL INSTALLATIONS:

- For proper flame pattern within the heat exchanger and proper condensate drainage, the unit must be mounted level.
- The flue outlet hood must be at least 12 inches from any opening through which flue gases could enter a building, and at least three feet above any forced air inlet located within ten feet. The economizer/manual fresh air intake/ motorized fresh air intake and combustion air inlet mounted on the unit are not affected by this restriction.
- To avoid possible corrosion of the heat exchanger, do not locate the unit in an area where the outdoor air (i.e. combustion air for the unit) will be frequently contaminated by compounds containing chlorine or fluorine. Common sources of such compounds include swimming pools and chlorine bleaches, paint stripper, adhesives, paints, varnishes, sealers, waxes (which are not yet dried) and solvents used during construction and remodeling. Various commercial and industrial processes may also be sources of chlorine/fluorine compounds.
- To avoid possible illness or death of the building occupants, do NOT locate outside air intake device (economizer, manual fresh air intake, motorized fresh air intake) too close to an exhaust outlet, gas vent termination, or plumbing vent outlet. For specific distances required, consult local codes.

- Allow clearances from the enclosure as shown in Specification Sheet for fire protection, proper operation, and service access. These clearances must be permanently maintained.
- The combustion air inlet and flue outlet hoods on the side of the unit must never be obstructed. If used, do not allow the economizer/manual fresh air damper/ motorized fresh air damper to become blocked by snow or debris. In some climates or locations, it may be necessary to elevate the unit to avoid these problems.
- When the unit is heating, the temperature of the return air entering the unit must be between 50° F and 100° F.
- Provisions must be made for adequate combustion and ventilation air in accordance with Section 5.3, Air for Combustion and Ventilation, of the National Fuel Gas Code, ANSI Z223.1, or Sections 7.2, 7.3 or 7.4 of CAN/CGA B149 Installation Codes, or applicable provisions of the local building codes.

GROUND LEVEL INSTALLATIONS ONLY:

- When the unit is installed on the ground adjacent to the building, a level concrete (or equal) base is recommended. Prepare a base the same physical size as the unit or slightly larger and 3 inches thick.
- The base should also be located where no runoff of water from higher ground can collect in the unit.

ROOFTOP INSTALLATIONS ONLY:

- To avoid possible personal injury or property damage, the roof must have sufficient structural strength to carry the weight of the unit(s) and snow or water loads as required by local codes.
- The unit may be installed directly on wood floors or on Class A, Class B, or Class C roof covering material.
- To avoid possible personal injury, a safe, flat surface for service personnel should be provided.

  NOTE: Refer to Specification Sheet shipped with the unit or the unit Rating Plate for approved duct orientation, before using down discharge openings.

II. General Information

WARNING

To prevent death, personal injury or property damage due to fire, explosions, smoke, soot, condensation, electric shock or carbon monoxide, this unit must be properly installed, repaired, operated and maintained.

This unit is approved only for an outdoor installation. To assure that your unit operates safely and efficiently, it must be installed, operated, and maintained in accordance with these installation and operating instructions, all local building codes and ordinances, or in their absence, with the latest edition of the National Fuel Gas Code. (ANSI Z223.1) and National Standard of Canada (CAN/CGA-2.3).

The heating and cooling capacities of the unit should be greater than or equal to the design heating and cooling loads of the area to be conditioned. The loads should be calculated by an approved method or in accordance with A.S.H.R.A.E. Guide or Manual J - Load Calculations published by the Air Conditioning Contractors of America.

Obtain from:

American National Standards Institute
1430 Broadway
New York, NY 10018

TRANSPORTATION DAMAGE

All units are securely packed in shipping containers approved by the International Safe Transit Association. The carton should be checked upon arrival for external damage. If damage is found, a request for inspection by carrier agent should be made in writing immediately.

The unit should be carefully inspected upon arrival for damage and bolts or screws which may have loosened in transit. In the event of damage, the consignee should:

1. Make notation on delivery receipt of any visible damage to shipment or container.
2. Notify carrier promptly and request an inspection.
3. In case of concealed damage, carrier should be notified as soon as possible-preferably within 5 days.
4. File the claim with the following supporting documents within the 9 month statute of limitations.
   a. Original Bill of Lading, certified copy, or indemnity bond.
   b. Original paid freight bill or indemnity in lieu thereof.
   c. Original invoice or certified copy thereof, showing trade and other discounts or reductions.
   d. Copy of the inspection report issued by carrier representative at the time damage is reported to the carrier. The carrier is responsible for making prompt inspection of damage and for a thorough investigation of each claim. The distributor or manufacturer will not accept claims from dealers for transportation damage.

NOTE: When inspecting the unit for transportation damage, remove all packaging materials. Recycle or dispose the packaging material according to local codes.

III. Rigging and Handling

CAUTION

To prevent property damage, the unit should remain in an upright position during all rigging and moving operations. To facilitate lifting and moving when a crane is used, place the unit in an adequate cable sling.

NOTE: Refer to Specification Sheet shipped with the unit or the unit Rating Plate for approved duct orientation, before using down discharge openings.

Important: If using bottom discharge with roof curb, ductwork should be attached to the curb prior to installing the unit. Ductwork dimensions are shown in roof curb installation instructions.

Refer to the Roof Curb Installation Instructions for proper curb installation. Curbing must be installed in compliance with the National Roofing Contractors Association Manual.

Lower unit carefully onto roof mounting curb. While rigging unit, center of gravity will cause condenser end to be lower than supply air end.

If using a fork lift, see Figure 1 for location of fork prongs. Make certain prongs support unit weight.

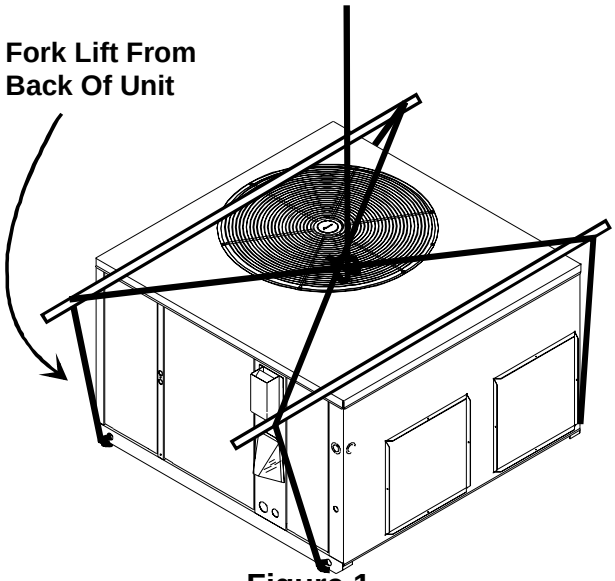


Figure 1
Rigging

IV. Gas Piping

IMPORTANT NOTE: This unit is factory set to operate on natural gas at the altitudes shown on the rating plate.

⚠ WARNING

To prevent death, personal injury or property damage when either using propane gas alone or at higher altitudes, obtain and install the proper conversion kit(s). Failure to do so can result in unsatisfactory operation and/or equipment damage. High altitude kits are for U.S. installations only and are not approved for use in Canada.

The rating plate is stamped with the model number, type of gas and gas input rating. Make sure the unit is equipped to operate on the type of gas available.

Inlet Gas Pressure	
Natural	Min. 5.0" W.C., Max. 10.0" W.C.
Propane	Min. 11.0" W.C., Max. 13.0" W.C.

Inlet Gas Pressure Must Not Exceed the Maximum Value Shown in Table Above.

Table 1

The minimum supply pressure should not vary from that shown in the table above because this could prevent the unit from having dependable ignition. In addition, gas input to the burners must not exceed the rated input shown on the rating plate. Overfiring of the unit could result in premature heat exchanger failure.

HIGH ALTITUDE DERATE (US. INSTALLATIONS ONLY)

IMPORTANT NOTE: The gas/electric units will naturally derate itself with altitude. Do not attempt to increase the firing rate by changing orifices or increasing the manifold pressure. This can cause poor combustion and equipment failure.

At all altitudes, the manifold pressure must be within 0.3 inches W.C. of that listed on the "Specification Sheet" for the fuel used. At all altitudes and with either fuel, the air temperature rise must be within the range listed on the unit nameplate.

Refer to the "Specification Sheet" for kits for conversion from natural gas to propane gas and for altitude adjustments.

PIPING

IMPORTANT NOTE: To avoid possible unsatisfactory operation or equipment damage due to under firing of equipment, do not undersize the natural/propane gas piping from the meter/tank to the unit. When sizing a trunk line as shown in Table 2, include all appliances on that line that could be operated simultaneously.

The rating plate is stamped with the model number, type of gas and gas input rating. Make sure the unit is equipped to operate on the type of gas available.

The gas line installation must comply with local codes, or in the absence of local codes, with the latest edition of the National Fuel Gas Code (ANSI Z223.1).

NATURAL GAS CONNECTION

Natural Gas Capacity of Pipe in Cubic Feet of Gas Per Hour (CFH)					
Length of Pipe in Feet	Nominal Black Pipe Size (inches)				
	1/2	3/4	1	1 1/4	1 1/2
10	132	278	520	1050	1600
20	92	190	350	730	1100
30	73	152	285	590	980
40	63	130	245	500	760
50	56	115	215	440	670
60	50	105	195	400	610
70	46	96	180	370	560
80	43	90	170	350	530
90	40	84	160	320	490
100	38	79	150	305	460

Pressure = .50 PSIG or less and Pressure Drop of 0.3" W.C. (Based on 0.60 Specific Gravity Gas)

$$CFH = \frac{\text{BTUH Furnace Input}}{\text{Heating Value of Gas (BTU/Cubic Foot)}}$$

Table 2

Refer to Figure 2 for the general layout at the unit. The following rules apply:

1. Use black iron or steel pipe and fittings for the building piping.
2. Use pipe joint compound on male threads only. Pipe joint compound must be resistant to the action of the fuel used.
3. Use ground joint unions.
4. Install a drip leg to trap dirt and moisture before it can enter the gas valve. The drip leg must be a minimum of three inches long.
5. Use two pipe wrenches when making connection to the gas valve to keep it from turning.
6. Install a manual shut-off valve in a convenient location (within six feet of unit) between the meter and the unit.
7. Tighten all joints securely.
8. The unit must be connected to the building piping by one of the following methods:
   - Rigid metallic pipe and fittings
   - Semirigid metallic tubing and metallic fittings (Aluminum alloy tubing must not be used in exterior locations)
   - Listed gas appliance connectors used in accordance with the terms of their listing that are completely in the same room as the equipment
   - In the prior two methods above the connector or tubing must be protected from physical and thermal damage. Aluminum alloy tubing and connectors must be coated to protect against external corrosion when in contact with masonry, plaster or insulation or are subject to repeated wettings by liquids (water - not rain water, detergents or sewage)

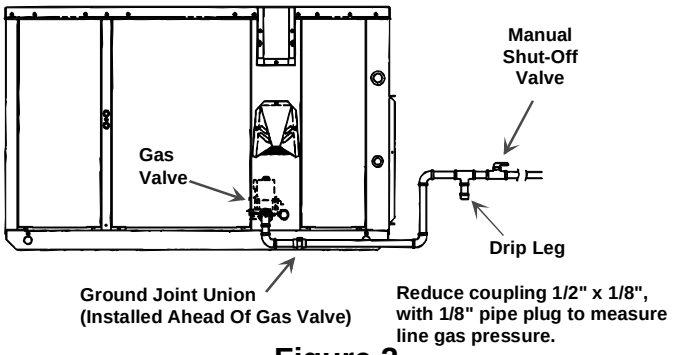


Figure 2
Proper Piping Practice

CHECKING THE GAS PIPING

CAUTION

To prevent personal injury or property damage due to fire, the following instructions must be performed regarding gas connections and pressure testing:

- **The unit and its gas connections must be leak tested before placing in operation. Because of the danger of explosion or fire, never use a match or open flame to test for leaks. Never exceed specified pressures for testing. Higher pressure may damage gas valve and cause overfiring which may result in premature heat exchange failure.**
- **This unit and its shut-off valve must be disconnected from the gas supply during any pressure testing of that system at test pressures in excess of 1/2 PSIG (3.48 kPa).**
- **This unit must be isolated from the gas supply system by closing its manual shut-off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 PSIG (3.48kPa).**

WARNING

To avoid personal injury or property damage, be sure there is no open flame in the vicinity during air bleeding procedure.

There will be air in the gas supply line after testing for leaks on a new installation. Therefore, the air must be bled from the line by loosening the ground joint union until pure gas is expelled. Tighten union and wait for five minutes until all gas has been dissipated in the air. Be certain there is no open flame in the vicinity during air bleeding procedure. The unit is placed in operation by closing the main electrical disconnect switch for the unit.

TANKS AND PIPING FOR PROPANE GAS INSTALLATIONS

WARNING

To prevent death, personal injury or property damage due to fire or explosion caused by a propane gas leak, install a gas detecting warning device. Since rust can reduce the level of odorant in propane gas, a gas detecting warning device is the only reliable way to detect a propane gas leak. Contact a local propane gas supplier about installing a gas detecting warning device.

IMPORTANT NOTE: Propane gas conversion kits must be installed to convert units to propane gas. See Specification Sheet for kit part number for this model.

All propane gas equipment must conform to the safety standards of the National Board of Fire Underwriters (See NBFU Manual 58).

For satisfactory operation, propane gas supply pressure must be 10 inch W.C. at the unit manifold with all gas appliances in operation. Maintaining proper gas pressure depends on three main factors:

1. Vaporization rate, which depends on (a) temperature of the liquid, and (b) wetted surface area of the container or containers.
2. Proper pressure regulation.
3. Pressure drop in lines between regulators, and between second stage regulator and the appliance. Pipe size required will depend on length of pipe run and total load of all appliances.

Complete information regarding tank sizing for vaporization, recommended regulator settings and pipe sizing is available from most regulator manufacturers and propane gas suppliers.

Since propane gas will quickly dissolve white lead or most standard commercial compounds, special pipe dope must be used. Shellac base compounds resistant to the actions of liquefied petroleum gases such as Gasolac, Stalactic, Clyde's or John Crane are satisfactory.

Please refer to Figure 3 for typical propane gas installations.

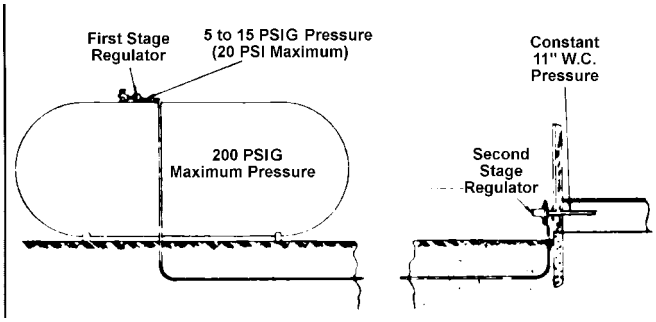

First Stage Regulator
5 to 15 PSIG Pressure (20 PSI Maximum)
200 PSIG Maximum Pressure
Constant 11" W.C. Pressure
Second Stage Regulator

Figure 3
Typical Propane Gas Piping

Sizing Between First and Second Stage Regulator
Maximum Propane Capacities listed are based on 2 PSIG Pressure Drop at 10 PSIG Setting. Capacities in 1,000 BTU/HR

PIPE OR TUBING LENGTH, FEET	TUBING SIZE, O.D., TYPE L					NOMINAL PIPE SIZE, SCHEDULE 40	
	3/8"	1/2"	5/8"	3/4"	7/8"	1/2"	3/4"
10	730	1,700	3,200	5,300	8,300	3,200	7,500
20	500	1,100	2,200	3,700	5,800	2,200	4,200
30	400	920	2,000	2,900	4,700	1,800	4,000
40	370	850	1,700	2,700	4,100	1,600	3,700
50	330	770	1,500	2,400	3,700	1,500	3,400
60	300	700	1,300	2,200	3,300	1,300	3,100
80	260	610	1,200	1,900	2,900	1,200	2,600
100	220	540	1,000	1,700	2,600	1,000	2,300
125	200	490	900	1,400	2,300	900	2,100
150	190	430	830	1,300	2,100	830	1,900
175	170	400	780	1,200	1,900	770	1,700
200	160	380	730	1,100	1,800	720	1,500

To Convert to Capacities at 15 PSIG Settings — Multiply by 1.130
To Convert to Capacities at 5 PSIG Settings — Multiply by 0.879

Sizing Between Single or Second Stage Regulator and Appliance*
Maximum Propane Capacities Listed are Based on 1/2" W.C. Pressure Drop at 11" W.C. Setting. Capacities in 1,000 BTU/HR

PIPE OR TUBING LENGTH, FEET	TUBING SIZE, O.D., TYPE L						NOMINAL PIPE SIZE, SCHEDULE 40				
	3/8"	1/2"	5/8"	3/4"	7/8"	1-1/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"
10	39	92	199	329	501	935	275	567	1,071	2,205	3,307
20	26	62	131	216	346	630	189	393	732	1,496	2,299
30	21	50	107	181	277	500	152	315	590	1,212	1,858
40	19	41	90	145	233	427	129	267	504	1,039	1,559
50	18	37	79	131	198	376	114	237	448	913	1,417
60	16	35	72	121	187	340	103	217	409	834	1,275
80	13	29	62	104	155	289	89	185	346	724	1,086
100	11	26	55	90	138	255	78	162	307	630	976
125	10	24	48	81	122	224	69	146	275	567	866
150	9	21	43	72	109	202	63	132	252	511	787
200	8	19	39	66	100	187	54	112	209	439	665
250	8	17	36	60	93	172	48	100	185	390	590

*DATA IN ACCORDANCE WITH NFPA PAMPHLET NO. 54

Table 3
Propane Gas Pipe Sizing

WARNING

To prevent death, serious personal injury or property damage due to fire or explosion caused by a propane gas leak, install a gas detecting warning device.
If the propane gas unit is installed in an excavated area or a confined space, a warning device is required due to:

- **Propane gas is heavier than air and any leaking gas can settle in any low areas or confined spaces.**
- **Propane gas odorant may fade, making the gas undetectable except with a warning device.**

If the presence of gas is suspected, follow the instructions on Page 2 of this manual.

V. Electrical Wiring

LOCATING THE THERMOSTAT

Thermostat should be mounted 5 feet above the floor, on a vibration free inside wall in a room or a hallway that has good air circulation.

Movement of air should not be obstructed by furniture, door, draperies, etc. The thermostat should not be mounted where it will be affected by drafts, hot or cold water pipes or air ducts in walls, radiant heat from fireplace, lamps, the sun, television, etc. Consult the Instruction Sheet packaged with thermostat for mounting instructions.

All units have one stage of heating and one stage of mechanical cooling. Units which will have economizers may use thermostats with one or two stages of cooling.

⚠ WARNING

To avoid death or personal injury due to electrical shock, disconnect the electrical power before electrically connecting the unit.

The units are designed for operation on 60 hertz current and at voltages as shown on the rating plate. All internal wiring in the unit is complete. It is necessary to bring in the power supply to the contactor as shown on the unit wiring diagram which is supplied with each unit. 24 volt wiring must be connected between the unit control panel and the room thermostat. Refer to Figure 4 for location of low voltage terminal board and Figure 6 for proper thermostat wiring.

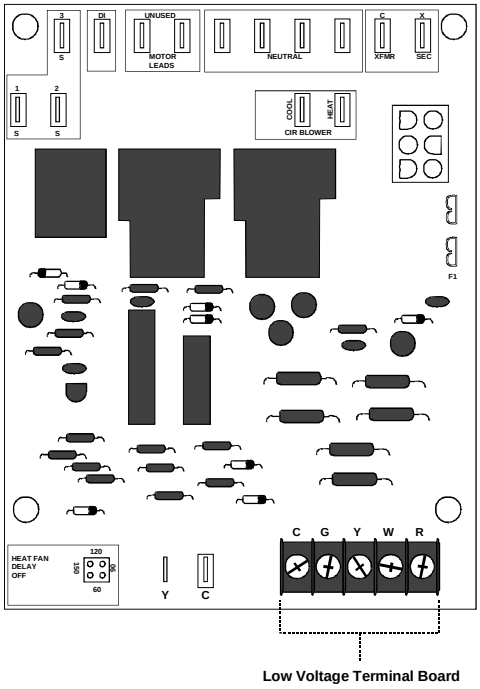


Figure 4
Low Voltage Control Board

Refer to the unit wiring diagram for electrical connections. When installed, the unit must be electrically grounded in accordance with local codes or in the absence of local codes, with the National Electrical Code, ANSI/NFPA No. 70, and/or the CSA C22.1 Electrical Code, if an external source is utilized.

⚠ WARNING

To avoid death or personal injury due to electrical shock, wiring to the unit must be properly grounded.

⚠ CAUTION

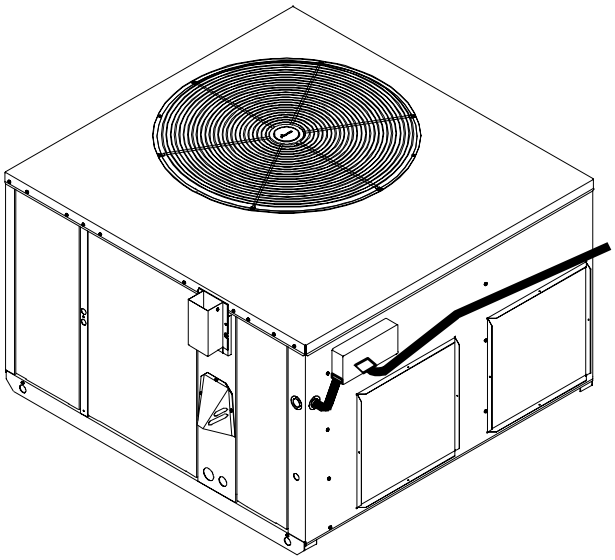
To avoid personal injury or property damage due to fire, use only copper conductors.

⚠ CAUTION

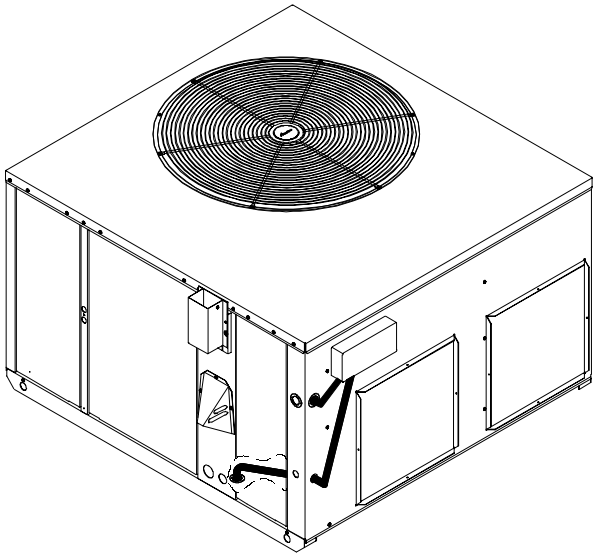
To prevent improper and dangerous operation due to wiring errors, label all wires prior to disconnection when servicing controls. Verify proper operation after servicing.

The best protection for the wiring is the lowest rated fuse or circuit breaker which will supply power to the unit during normal operation without nuisance trips. Such a device will provide maximum circuit protection. DO NOT EXCEED THE MAXIMUM OVERCURRENT DEVICE SIZE SHOWN ON UNIT DATA PLATE.

All line voltage connections must be made through weatherproof fittings. All exterior power supply and ground wiring must be in approved weatherproof conduit. Low voltage wiring from the unit control panel to the thermostat requires coded cable. For ground level and rooftop wiring refer to Figure 5.



Electrical Power Directly To Junction Box



Electrical Power Routed Through Bottom of Unit

Figure 5
Typical Electrical Wiring

UNIT VOLTAGE
The unit transformer is factory connected for 230V operation. If the unit is to operate on 208V, reconnect the transformer primary lead and induced draft blower motor leads as shown on the unit wiring diagram.

HEAT ANTICIPATOR SETTING
The heat anticipator in the room thermostat must be correctly adjusted to obtain the proper number of heating cycles per hour and to prevent the room temperature from overshooting the room thermostat setting. Heat anticipator must be set at 0.4 amps.

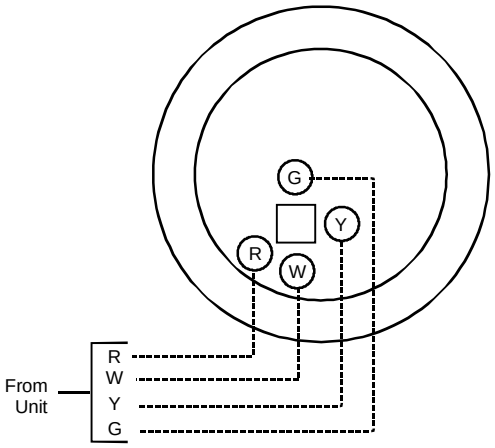


Figure 6
Typical Thermostat and Unit 24 V Wiring Hookup

VI. Circulating Air and Filters

AIRFLOW CONVERSION
Units can easily be converted from horizontal to vertical airflow delivery.

Units will ship from the factory ready for horizontal airflow. If conversion to vertical airflow is necessary, proceed as follows:

NOTE: Refer to Specification Sheet shipped with the unit or the unit Rating Plate for approved duct orientation, before using down discharge openings.

- Cut insulation around bottom openings and remove panels from the bottom of the unit, saving the screws holding the panels in place.
- Use horizontal duct cover kit.

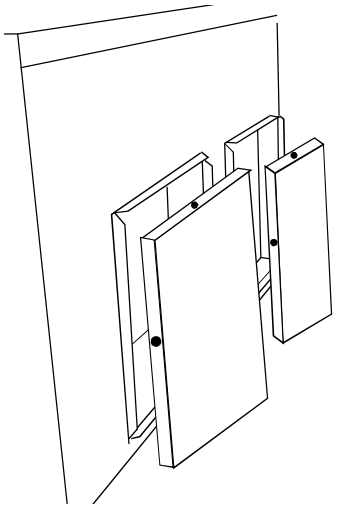


Figure 7
Horizontal Duct Cover Kit

DUCTWORK
Duct systems and register sizes must be properly designed for the C.F.M. and external static pressure rating of the unit. Ductwork should be designed in accordance with the recommended methods of Air Conditioning Contractors of America Manual D (Residential) or Manual Q (Commercial).

All ductwork exposed to the outdoors must include a weatherproof barrier and adequate insulation.

A duct system should be installed in accordance with Standards of the National Board of Fire Underwriters for the Installation of Air Conditioning, Warm Air Heating and Ventilating Systems. Pamphlets No. 90A and 90B.

The warm air supply duct from the unit through a wall fabricated of combustible material may be installed without clearance. However, minimum clearances for the unit must be observed as shown in Specification Sheet.

The outlet duct should be provided with an access panel. This access should be large enough to inspect the air chamber downstream from the heat exchanger for any smoke or combustion gas leaks. A cover should be tightly attached to prevent air leaks.

For horizontal airflow, duct flange dimensions on the unit are shown in Specification Sheet.

For vertical airflow, the ductwork should be attached to the roof curb prior to installing the unit. Ductwork dimensions are shown in the roof curb installation manual.

If desired, supply and return duct connections to the unit may be made with flexible connections to reduce possible unit operating sound transmission.

FILTERS

CAUTION

To prevent property damage due to fire and loss of equipment efficiency or equipment damage due to dust and lint build up on internal parts, never operate unit without an air filter installed in the return air system.

Even though a return air filter is not supplied with this unit, there must be a means of filtering all return air.

Refer to Specification Sheet provided with unit for filter size information.

If using the Over/Under Transition Kit, the filter(s) may be located in the return air duct(s) or return air filter grille(s). Filters installed external to the unit should be sized in accordance with their manufacturer recommendations. A throwaway filter must be sized for a maximum face velocity of 300 feet per minute.

FILTER INSTALLATION

Important: When installing a filter, the air flow arrows on the filter must point at the indoor blower.

VII. Venting

FLUE HOOD AND AIR INLET HOOD INSTALLATION

Install the flue hood and air inlet hood prior to operation of the unit. See Figure 8.

To install the flue hood cover:

1. Remove the flue hood and bug screen from inside the heating compartment.
2. Attach the flue hood and screen with the sheet metal screw provided.

To install the air inlet hood:

1. Remove hood from the heating compartment.
2. Attach hood by using the supplied sheet metal screws.

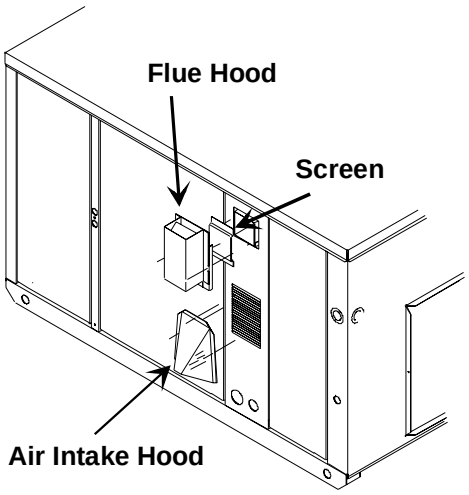


Figure 8
Air Inlet Hood and Flue Hood

VENTING

NOTE: Venting is self-contained. Do not modify or block.

VIII. Condensate Drain

CONDENSATE DRAIN CONNECTION

This unit has a built in trap - no external trap is required.

To avoid double trapping and an overflowing drain pan, soft plastic drain lines are not recommended.

IX. Heating Sequence of Operations

NORMAL SEQUENCE OF OPERATION - HEATING

1. Thermostat calls for heat. The combustion blower is immediately energized.
2. The pressure switch contacts transfer.
3. The ignitor is energized and pilot gas begins to flow.
4. After pilot flame is proven, the main valve is energized and the pilot will light the main burners.
5. The control checks the signal from the flame sensor. Gas flow will continue only if a proper signal is present. As soon as pilot flame is proven, the ignitor is de-energized.
6. The unit will continue to fire for 30 seconds. The fan control will then start the main circulating air blower.
7. The unit will deliver heat to the conditioned space until the thermostat is satisfied.

8. The gas valve and combustion blower will be de-energized when the thermostat opens.
9. There is an adjustable Heat Fan OFF of approximately 60/90/120/150 second delay (factory set at 120). The control module will de-energize the blower once the selected time has elapsed. This allows any additional heat in the heat exchanger to be transferred to the conditioned space.

X. Cooling Sequence of Operations

NORMAL SEQUENCE OF OPERATIONS - COOLING

1. Thermostat calls for cooling. The compressor and outdoor fan are energized.
2. Approximately six seconds later, the indoor fan starts.
3. The unit will deliver cooling to the conditioned space until the thermostat is satisfied.
4. The compressor and outdoor fan will be de-energized when the thermostat opens.
5. The indoor fan continues to run for approximately 30 seconds after the thermostat is satisfied. This allows additional cooling from the indoor coil to be transferred to the conditioned space. Then, the indoor fan stops.

XI. Startup and Adjustment

HEATING STARTUP

GENERAL INFORMATION

This unit is equipped with an electronic ignition device to light the pilot which then lights the burners. It also has a power vent blower to exhaust combustion products.

On new installations, or if a major component has been replaced, the operation of the unit must be checked.

Check unit operation as outlined in the following instructions. If any sparking, odors, or unusual sounds are encountered, shut off electrical power and recheck for wiring errors, or obstructions in or near the blower motors. Duct covers must be removed before operating unit.

HEAT ANTICIPATOR SETTING

The heat anticipator in the room thermostat must be correctly adjusted to obtain the proper number of heating cycles per hour and to prevent the room temperature from overshooting the room thermostat setting. Heat anticipator must be set at 0.4 amps.

ROLL-OUT PROTECTION CONTROL

If the flames from the burners are not properly drawn into the heat exchanger, a roll-out protection device will open, cutting power to the gas valve. The roll-out protection device is located on the side of burner box (Figure 9). The reason for elevated temperatures at the control should be determined and repaired prior to resetting this manual reset control.

⚠ WARNING

To prevent death, personal injury or property damage due to fire or explosion, before manually resetting the roll-out protection device, a qualified servicer must investigate the reason for the roll-out protection device to open.

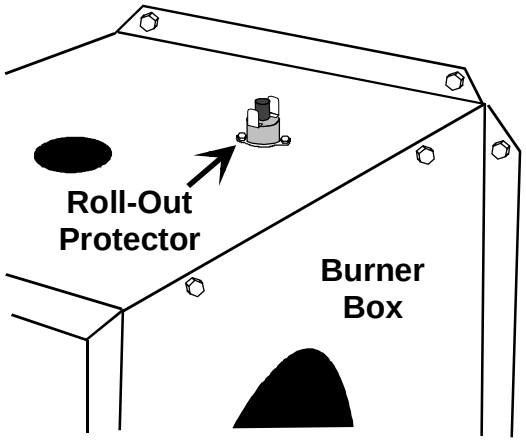


Figure 9
Rollout Protection

SECONDARY LIMIT CONTROL

A second limit control is placed on the blower scroll. This control will open due to elevated temperature caused by the blower failing. The reason for elevated temperatures at the control should be determined and repaired prior to resetting this manual reset control. The secondary limit control is located on the top of the blower scroll assembly. (Figure 10)

If the power to the unit is interrupted during the heating cycle, it may cause the secondary limit to trip. To reset, press the red button on the limit.

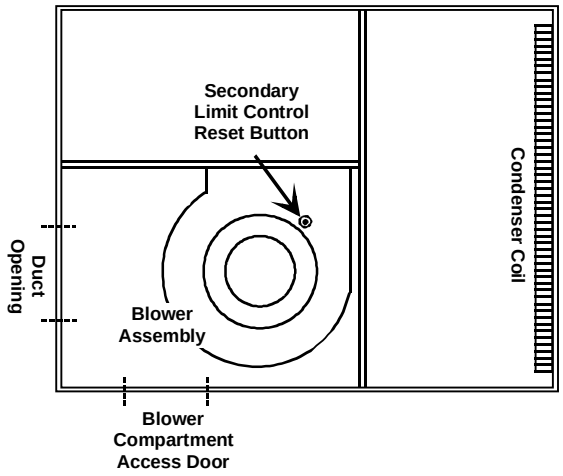


Figure 10
Secondary Limit Control (Top View)

OPERATING INSTRUCTIONS (HEATING)

NOTE: Figure 2 illustrates the proper gas valve mounting location.

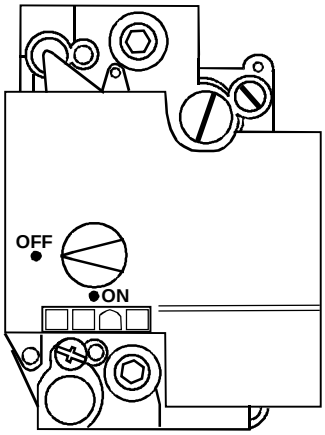


Figure 11
Honeywell Gas Valve SV9500
(Top View)

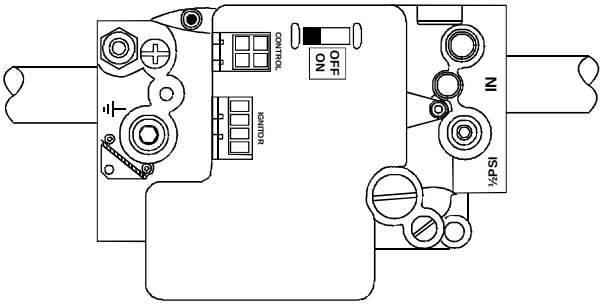


Figure 12
Honeywell Gas Valve SV9501
(Top View)

1. Close the manual gas valve external to the unit.
2. Turn off the electrical power supply to the unit.
3. Set the room thermostat to its lowest possible setting.
4. Remove the heat exchanger door on the side of the unit by removing screws.
5. This unit is equipped with an ignition device which automatically lights the pilot. Do NOT try to light burner by any other method.
6. Turn the gas control valve knob or switch to the OFF position. Do not force. (Figures 11 or 12)
7. Wait five minutes to clear out any gas.
8. Smell for gas, including near the ground. This is important because some types of gas are heavier than air. If you have waited five minutes and you do smell gas, immediately follow the instructions on the Page 2 of this manual. If having waited for five minutes and no gas smell is noted, turn the gas control valve knob or switch to the ON position. (Figures 11 or 12)
9. Replace the heat exchanger door on the side of the unit.
10. Open the manual gas valve external to the unit.
11. Turn on the electrical power supply to the unit.
12. Set the thermostat to desired setting.

GAS INPUT AND PRESSURES

Gas supply pressure and manifold pressure with the burners operating must be as specified on the rating plate.

GAS PRESSURE CHECKS

Gas inlet pressure must be checked and adjusted in accordance to the type of fuel being consumed.

WITH POWER AND GAS OFF:

1. Connect a water manometer or adequate gauge to the inlet pressure tap of the gas valve.

Inlet gas pressure can also be measured by removing the cap from the dripleg and installing a predrilled cap with a hose fitting(Figure 14).

WITH POWER AND GAS ON:

2. Put unit into heating cycle and turn on all other gas consuming appliances.

Inlet Gas Pressure	
Natural	Min. 5.0" W.C., Max. 10.0" W.C.
Propane	Min. 11.0" W.C., Max. 13.0" W.C.

Figure 13
Inlet Gas Pressure

Note: Inlet Gas Pressure Must Not Exceed the Maximum Value Shown.

If operating pressures differ from above, make necessary pressure regulator adjustments, check piping size, etc., and/or consult with local utility.

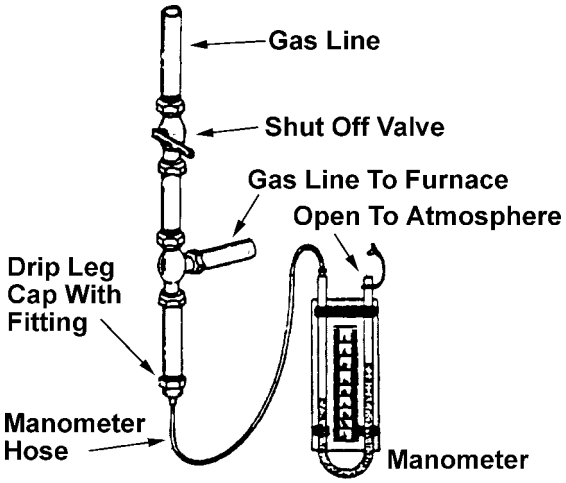


Figure 14
Measuring Inlet Gas Pressure
Alternate Method

CHECK THE MANIFOLD PRESSURE

A tapped opening is provided in the gas valve to facilitate measurement of the manifold pressure. A "U" Tube manometer having a scale range from 0 to 12 inches of water should be used for this measurement. The manifold pressure must be measured with the burners operating.

To adjust the pressure regulator, remove the adjustment screw or cover on the gas valve. Turn out (counterclockwise) to decrease pressure, turn in (clockwise) to increase pressure. Only small variations in gas flow should be made by means of the pressure regulator adjustment. In no case should the final manifold pressure vary more than plus or minus 0.3 inches water column from the specified pressure. Any major changes in flow should be made by changing the size of the burner orifices. The measured input rate to the furnace must not exceed the rating specified on the unit rating plate.

For natural gas, the manifold pressure must be between 3.0 and 3.6 inches water column (3.5 nominal).

For propane gas, the manifold pressure must be between 9.7 and 10.3 inches water column (10.0 nominal).

CHECK THE GAS INPUT (NATURAL GAS ONLY)

NOTE: On outdoor equipment, the gas input will vary with the temperature of the gas. Rated input will be obtained at approximately 10° F. With warmer ambient and gas temperatures, the input will decrease. **Example:** At 70° F the input will decrease 12%.

To measure the gas input using the gas meter proceed as follows:

1. Turn off gas supply to all other appliances except the unit.
2. With the unit operating, time the smallest dial on the meter for one complete revolution. If this is a 2 cubic foot dial, divide the seconds by 2; if it is a 1 cubic foot dial, use the seconds as is. This gives the seconds per cubic foot of gas being delivered to the unit.
3. INPUT=GAS HTG VALUE x 3600 / SEC. PER CUBIC FOOT

Example: Natural gas with a heating value of 1000 BTU per cubic foot and 34 seconds per cubic foot as determined by Step 2, then:

Input = 1000 x 3600 / 34 = 106,000 BTU per Hour. **NOTE:** BTU content of the gas should be obtained from the gas supplier. This measured input must not be greater than shown on the unit rating plate.

4. Relight all other appliances turned off in step 1. Be sure all pilot burners are operating.

CHECK MAIN BURNER FLAME

Flames should be stable, soft and blue (dust may cause orange tips but they must not be yellow) and extending directly outward from the burner without curling, floating or lifting off.

CHECK TEMPERATURE RISE

Check the temperature rise through the unit by placing thermometers in supply and return air registers as close to the unit as possible. Thermometers must not be able to sample temperature directly from the unit heat exchangers, or false readings could be obtained.

1. All registers must be open; all duct dampers must be in their final (fully or partially open) position and the unit operated for 15 minutes before taking readings.
2. The temperature rise must be within the range specified on the rating plate.

NOTE: Air temperature rise is the temperature difference between supply and return air.

With a properly designed system, the proper amount of temperature rise will normally be obtained when the unit is operated at rated input with the recommended blower speed.

If the correct amount of temperature rise is not obtained, it may be necessary to change the blower speed. A higher blower speed will lower the temperature rise. A slower blower speed will increase the temperature rise.

NOTE: Blower speed MUST be set to give the correct air temperature rise through the unit as marked on the rating plate.

CHECKING EXTERNAL STATIC PRESSURE

The total external static pressure must be checked on this unit to determine if the airflow is proper.

CHANGING BLOWER SPEEDS

WARNING

To avoid death or personal injury due to electric shock, remove electrical power from the unit before changing speed taps on the blower motor.

Refer to the wiring diagram on the unit to verify speed tap settings.

Blower speeds can be changed on the fan timer board. Both heat speed and cool speed terminals are supplied on the board along with two unused motor lead terminals (Figure 15).

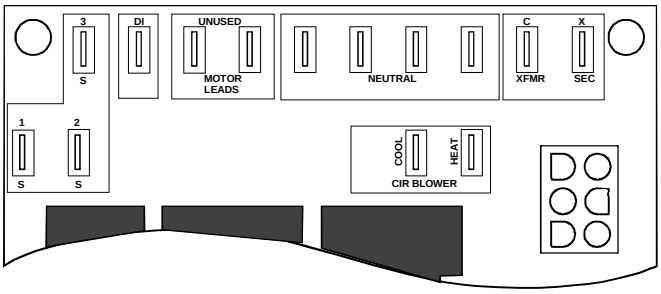


Figure 15
Control Board (Top)

CHECK LIMIT

Check limit control operation after 15 minutes of operation by blocking the return air grille(s).

1. After several minutes the main burners must go OFF. Blower will continue to run.
2. Remove air restrictions and main burners will relight after a cool down period of a few minutes.

Adjust the thermostat setting below room temperature.

1. Main burners must go off.

2. Circulating Air Blower will continue to run for 60, 90, 120 or 150 seconds, depending on the setting.

NOTE: If necessary, adjust fan OFF delay settings to obtain satisfactory comfort level.

⚠ CAUTION

This unit must not be used as a "construction heater" during the finishing phases of construction on a new structure. This type of use may result in premature failure of the unit due to extremely low return air temperatures and exposure to very dirty atmospheres.

TO TURN OFF UNIT

1. Set the thermostat to lowest setting.
2. Turn off the electrical power supply to the unit.
3. Remove the heat exchanger door on the side of the unit by removing screws.
4. Turn the gas control valve knob to the OFF position. Do not force. See Figures 11 and 12.
5. Close manual gas shutoff valve external to the unit.
6. Replace the heat exchanger door on the unit.
7. If cooling and/or air circulation will be desired, turn ON the electrical power.

COOLING STARTUP

NOTE: Check all manual reset limit controls in heating circuit if cooling mode does not operate.

COMPRESSOR PROTECTION DEVICES

The compressor includes components which are designed to protect the compressor against abnormal operating conditions.

⚠ WARNING

To avoid death or personal injury, always disconnect electrical power before inspecting or servicing the unit. All compressor protection devices reset automatically, energizing the contactor and outdoor fan.

OPERATING INSTRUCTIONS (COOLING)

NOTE: Mechanical cooling cannot be reliably provided at ambient temperatures below 50° F.

1. Turn on the electrical power supply to the unit.
2. Place the room thermostat selector switch in the COOL position (or AUTO if available, and if automatic changeover from cooling to heating is desired).
3. Set the room thermostat to the desired temperature.

XII. Maintenance

⚠ WARNING

To avoid death or personal injury due to electrical shock, disconnect electrical power before performing any maintenance.

Important Note: Touching the ignitor body with bare fingers, rough handling, or vibration could result in early ignitor failure. Only a qualified servicer should ever handle the ignitor.

Have the gas heating section of the unit checked at least once a year before the heating season begins, to be sure that the combustion air inlet and flue outlet hoods are not blocked by debris, which would prevent adequate combustion air and a properly operating vent system.

REPLACING OR CLEANING FILTER

A return air filter is not supplied with this unit; however, there must be a means of filtering all of the return air. The filter(s) may be located in the return air duct(s), return air filter grille(s). Consult with your installing dealer for the actual location of the return air filter(s) for your unit.

Dirty filters are the most common cause of inadequate heating or cooling performance. Filter inspection should be made at least every two months; more often if necessary because of local conditions and usage.

Dirty throwaway filters should be discarded and replaced with a new, clean filter. Dirty permanent filters should be washed with water, thoroughly dried and sprayed with a filter adhesive before being reinstalled. (Filter adhesives may be found at many hardware stores.) Permanent filters should last several years. However, should one become torn or uncleanable, it should be replaced.

MAINTAINING CABINET FINISH

Use a fine grade automotive wax on the cabinet finish to maintain the finish's original high luster. This is especially important in area's with high ultraviolet radiation.

CLEAN OUTSIDE COIL (QUALIFIED SERVICER ONLY)

The coil with the outside air flowing over it should be inspected annually and cleaned as frequently as necessary to keep the finned areas free of lint, hair and debris.

CONDENSER, EVAPORATOR, AND INDUCED DRAFT MOTORS

Bearings on the air circulating blower motor, condenser motor and the combustion fan motor are permanently lubricated. No additional oiling is required.

FLAME SENSOR (QUALIFIED SERVICER ONLY)

A drop in the flame sensing signal can be caused by a nearly invisible coating on the flame sensor. This coating, created by the fuel or combustion air supply, can be removed by carefully cleaning the flame sensor with emery cloth or steel wool (Figure 16).

NOTE: After cleaning, the microamp signal should be in the range listed in Specification Sheet.

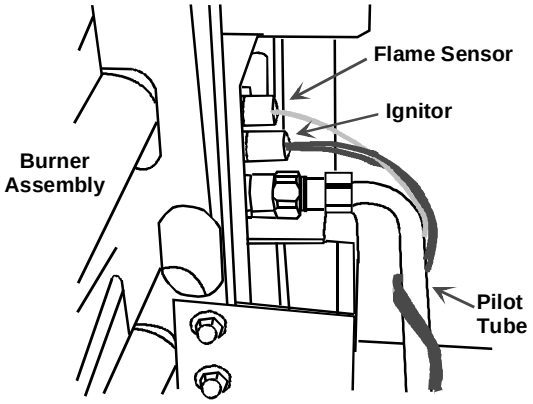


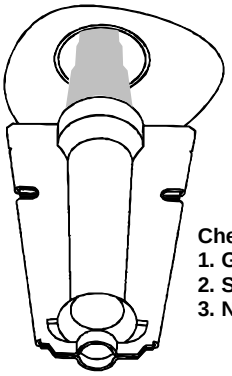
Figure 16
Ignitor and Flame Sensor

FLUE PASSAGES (QUALIFIED SERVICER ONLY)
At the start of each heating season, inspect and, if necessary, clean the unit flue passage.

CLEANING FLUE PASSAGES (QUALIFIED SERVICER ONLY)

1. Shut off electric power and gas supply to the unit.
2. Remove burner assembly by disconnecting the gas line and removing the manifold brackets from the partition panel.
3. Remove the flue from the induced draft blower and the collector box from the partition panel.
4. The primary heat exchanger tubes can be cleaned using a round wire brush attached to a length of high grade stainless steel cable, such as drain cleanout cable. Attach a variable speed reversible drill to the other end of the spring cable. Slowly rotate the cable with the drill and insert it into one of the primary heat exchanger tubes. While reversing the drill, work the cable in and out several times to obtain sufficient cleaning. Use a large cable for the large tube, and then repeat the operation with a small cable for the smaller tube. Repeat for each tube.
5. When all heat exchanger tubes have been cleaned, replace the parts in the reverse order in which they were removed.
6. To reduce the chances of repeated fouling of the heat exchanger, perform the steps listed in “Start-up and Adjustment”.

MAIN BURNER FLAME (QUALIFIED SERVICER ONLY)
Flames should be stable, soft and blue (dust may cause orange tips but must not be yellow). The flames must extend directly outward from the burner without curling, floating or lifting off (Figure 17).



Check the burner flames for:
1. Good adjustment
2. Stable, soft and blue
3. Not curling, floating, or lifting off.

Figure 17
Burner Flame

WARNING

To avoid death or personal injury due to electrical shock, do not remove any internal compartment covers or attempt any adjustment. Contact a qualified servicer at once if an abnormal flame appearance should develop.

At least once a year, prior to or during the heating season, make a visual check of the burner flames.

NOTE: This will involve removing and reinstalling the heat exchanger door on the unit, which is held by several screws. If you are uncertain about your ability to do this, contact a qualified servicer.

If a strong wind is blowing, it may alter the airflow pattern within the unit enough that an inspection of the burner flames is not possible.

CLEANING OF BURNERS

1. Shut off electric power and gas supply to the unit.
2. Remove the screws holding the burner retention bracket in place.
3. Remove the burners.
4. Use a bottle brush to clean burner insert and inside of the burners.
5. Replace burners and burner retention bracket, inspect the burner assembly for proper seating of burners in retention slots.
6. Reconnect electrical power and gas supply.

CAUTION

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

CAUTION

Verify proper operation after servicing.

For further information on the yearly inspection, consult the User Manual. It is recommended that a qualified servicer inspect and service the unit at least once each year.

Turn the unit on at the thermostat. Wait a few minutes, since any dislodged dust will alter the normal flame appearance. Flames should be predominantly blue and directed into the tubes. They should not be yellow. They should extend directly outward from the burner ports without curling downward, floating or lifting off the ports.

XIII. Accessories and Functional Parts

SHEET METAL ACCESSORIES

Additional Amana accessories, as described in Table 4, can be purchased to fit specific application needs. Accessories can be ordered by the part numbers in the table and each accessory includes its own separate instructions.

Accessory
Duct Transition Over/Under
Horizontal Duct Covers*
Compressor Sound Blanket
Horizontal Filter Kit
Propane Gas Conversion Kit
High Altitude Kit

* Standard on PGA**C

Table 4
Accessory List

FUNCTIONAL PARTS

Blower Housing	Flame Roll-Out Switch
Blower Motor	Gas Orifice
Blower Wheel	Heat Exchanger
Burner	High Limit Switch
Compressor	Secondary Limit
Condenser Coil	Ignitor/Flame Sensor
Condenser Fan Blade	Induced Draft Motor
Condenser Fan Motor	Pressure Switch
Contactor	Pressure Switch Hose
Evaporator Coil	Transformer
Fan Timer Board	

Figure 18
Functional Parts List

GENERAL INFORMATION

1. Refer to the description in Figure 18 when ordering any of the listed functional parts. Be sure to provide the unit model, manufacturing, and serial numbers with the order.
2. Although only functional parts are shown in Figure 18, all sheet metal parts, doors, etc. may be ordered by description.
3. Parts are available from your Amana distributor.